

Egyptian Pioneer Schools

Grade Six

science and you

First term

2018/2019



Contents

Primary six first term

Unit 1:-Force and motion

Lesson 1:- Mass and weight

Mass: -The amount of matter in an object.

The book has mass. G.R

Because there is an amount of matter in it.

-The mass of two bananas equals the mass of one apple. G.R

Because the amount of matter in the two bananas equals the amount of matter in one apple.

The properties of mass:-

1-The amount of **matter increases when the amount of matter in it increases**.

2-All matter **have mass** whatever their **physical states.**

3-All matter have mass whatever **their shapes.**

4-All matter have mass whatever **their places.**

5-The mass of any matter **is a fixed (stable)** value and it doesn't change by changing the state of matter and the place of matter.

By measuring the mass of an object on the earth surface, then measure the mass of the same object on the moon's surface we will notice that its mass **is not changed.**

The mass of a pen on the earth s surface equals to the mass of the same pen on the moon s surface. G.R

Because the mass of the pen is a fixed value and it doesn't change by changing the place.

The measuring units of mass:

kilogram	Gram	Ton
It suitable for measuring large masses. Ex: - Fruits and vegetables. It equals the mass of one liter of water.	It suitable for measuring small masses. Ex:-Jewellery It equals the mass of one paper clip.	It is used to measure very large masses. Ex:- cars

1Kilogram=1000 grams.

1Ton= 1000 kilograms

The mass of two eggs equals the mass of searchlight.

Because both the eggs and the searchlight contain the same amount of matter.

The measuring devices of mass

Mass is measured by different types of scales:-

One arm scales	Two arm scales
1- digital 2-pointer	1-balance 2-sensitive

1-To know how do you measure the mass of a solid object by a balance (two arm scale)

Mass of any solid object= the total mass of the standard masses.

Second:-Weight

Weight: - It is the gravitational force by which a body is attracted to the earth.

Notes:-

1-The effect of weight is always directed towards the center of the earth.

2-On earth all objects, have weight, but **in space** all objects are in a state of **weightlessness.**

The measuring units of weight :-

Newton: - it is the measuring unit of weight and it is almost equal to the weight of an object on the earth surface whose mass is 100 g.

Spring scale: - Is a device is used to measure the weight of any object.

Factors affecting the weight:

1-The object s mass.

2-The planet (place) where the objects exists.

3-the distance between the object and the center of the planet.



1-The object s mass:-

The relation between the weight of an object and its mass is a direct relationship.G.R

Because the weight increases by increasing the objects mass.

2-The planet (place) where the object exists:-

As the mass of the planet increases its gravitational force increases so the weight increases. (direct relationship)

Note: - the weight of the object on the moon s surface equals one sixths 1/6 of its weight on the earth surface G.R

Because earth has greatest mass and gravitational force than moon.

Weight = Mass x 10 (9.8)

-The weight of a person in a balloon is smaller than that on earth G.R

Because the gravitational force decreases.

3-The distance between the object and the center of the planet:-

The weight of anybody decreases when the distance between the body and the center of the planet increases.

Compare between mass and weight

P.o.c	Mass	Weight
-Definition	The amount of matter in an object.	The gravitational force by which a body is attracted to the earth.
Measuring unit	Kg -gram	Newton
Measuring device	A balance scale	A_spring scale
Its direction	No direction	Downward(toward the center of the earth)
The effect of changing the Place.	Constant	Variable

Work sheet

Lesson 1:-Mass and weight

1-Write the scientific term:

1- The amount of matter in an object . (................................)

2-The measuring unit of mass which equal the mass of one liter of water . (........................)

3-Aforce with which a body is attracted to the earth . (..................)

4- Mass × 10 . (.........................)

5- Weight / 10 . (.......................)

6 – The measuring unit of weight that is almost equal to the weight of an object whose mass is 100 grams . (...........................)

2-Give reason for :

1- The book has mass .

....

2- The weight of a bag in a balloon is smaller than that on earth.

....

3- The weight of a person on the earth's surface is larger than that on moon's surface.

....

4- Object 's falling downward earth .

....

5- The balance scale should be placed horizontally on a stable shelf.

....



3-Compare between sensitive two –arms scales and spring scales:

Comparison	sensitive scale	Spring scale

4-What's meant by ?

1- Mass: ……………………………………………………………………

2- Gram: ……………………………………………………………………

3- Weight: …………………………………………………………………

4-Newton: …………………………………………………………………...

5- Kilogram: ………………………………………………………………..



1-If an object its mass = 30 kg on earth, calculate .

a) Its mass on the moon

………………………………………………………………………………………

b) Its weight on the earth

………………………………………………………………………………………

c) Its weight on the moon

………………………………………………………………………………………

2- An object whose mass on earth is equal to 3kg . Calculate its weight on both surface of the earth and moon .

………………………………………………………………………………………
………………………………………………………………………………………
……………………………………………………………………



3- An object whose weight is 20 Newton on earth ,calculate its mass on the earth and moon.

…………………………………………………………………………………………………
…………………………………………………………………………………………………
………………………………………………………………………………..

4- Calculate the weight of a book in the moon 's surface ,where its weight on the earth 's surface is 3 Newton.

…………………………………………………………………………………………………
…………………………………………………………………………………………………
………………………………………………………………………………..

5- Calculate the mass of a cat whose weight is 50 Newton .

…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………



Unit 2:-Heat

Lesson 1:-Heat conduction



Is a form of energy that transfers from the **higher temperature** object to the object of **lower temperature.**

Notes:-

1-When you touch a piece of ice you feel cold. G.R

Due to the transfer of heat from your hand (high temperature) to the ice (lower temp.).

2-When you touch a glass of hot tea ,you feel hot. G.R

Due to the transfer of heat from the hot glass to a piece of ice.

Importance of heat

-Heat is an important form of energy in our daily life. G.R

1-It is important in our daily life in:-

a. Cooking b.Warming the house c.Heating water d.Drying washed clothes

2-Heat has countless usages in industry G.R

Because heat is used in making glass, paper, textiles and processing food.

What is meant by temperature?

Temperature: - is the degree of hotness or coldness of a body.

Thermometers:- are the measuring devices of temperature.



Elements and heat conduction

Compare between heat conductors and heat insulators:-

Good conductors of heat (Heat conductors)	Bad conductor of heat (Heat insulators)
They are the materials that let heat flow through.	They are the materials that let heat flow through .
Examples:- Copper , iron ,aluminum and stainless steel .	**Examples** :- Glass, wood , rubber , wool , gases, plastic
Uses:- Cooking pots (utensils and kettles)	**Uses : -** 1-Plastic and wood are used to make handle of cooking pots and Kettles . 2- Plastic is used to make iron handle . 3- Heavy blankets and woolen clothes. to keep the body warm .

Give reason for :

***Iron is a good conductor material. G.R**

Because it allows heat to flow through it.

***Wood is an insulator material. G.R**

Because it doesn't allow heat to flow through

All metals are similar in conducting heat?

a. **Copper** conducts heat faster than **aluminum.**

b. **Aluminum** conducts heat faster than **iron.**

-Copper differs from iron in conducting heat. G.R

Because copper conducts heat faster than iron.



Life applications on heat insulators and heat conductors

1-Heat insulators:-

-In cold countries, people benefit from air as an insulator material keeping heat.

-Air is used in making **the insulating glass windows.**

-The insulating glass window is made by bonding two glass sheets maintaining a space filled with air between them G.R

To prevent the leakage of heat.

2-Heat conductors:-

-Leaving spaces between railway bars G.R

To avoid train accidents as iron is a good conductor of heat, so it expands and twists by heat.



Work sheet

Unit two:-Thermal energy

Lesson one: Heat conduction

1-Complete the following:-

1……………………………,………………………..and……………………………..

are from the importance of heat in our daily life .

2-……………………is a good conductor of heat while air is …………………

3-Mterials are divided into …………………conductors and ………………………….

4-We measure the temperature by using ……………………………….

5-All metals are ……………………..conductors of heat.

6-…………………………..,…………………………………and ………………………………..are some usages of bad heat conductors.

7-………………………..is the degree of hotness and coldness.

8-……………………………is a form of energy.

9………………………..,………………….,………………..and…………..are bad conductors of heat.

10…………………..,……………………….,…………………….and…………………are good conductors of heat.

2-Put (√) or (x)

1-Copper is a good conductor of heat. ( )

2-Cooking pots are made of wood. ( )

3-Aluminium is a poor conductor of heat. ( )

4-The measuring device of temperature are scales. ( )

5-Handles of cooking pots are made of plastic. ( )

6-The degree of hotness or coldness is temperature. ( )

7-Some materials are good conductors of heat. ( )

8-Insulators are used in making heavy blankets and woolen clothes. (   )

9-The Celsius thermometer is used for measuring the temperature of human being.( )

10-We can measure the temperature accurately by touching. (   )

3-Compare between good conductor of heat and bad conductors of heat:-

Items	Good conductors	Bad conductors
Definition		
Examples		

Lesson 2:-Measuring temperature

The importance of measuring temperature .G.R

1-Helping us to measure the body temperature.

2 –Helping us to know the weather temperature which affects our life skills.

3-Some processes of food industries requires a certain temperature.

Thermometer Is a device that is used to measure the temperature.

Can we measure the temperature by touching only? ……why?

No we can't, because sense of touching helps us in finding out if the objects is hot or cold but it can't measure the temperature.

The idea of making thermometers:- depends on the changing in the volume of liquid by changing the temperature.

The main idea of making thermometers is the changing in the volume of liquid by changing the temperature where, liquids expand by heating and contract by cooling.

Types of thermometers

1-Medical thermometer.

2-Celsius thermometer.

Compare between Celsius thermometer and medical thermometers.

p.o.c	Medical thermometer	Celsius thermometer
Usage	To measure the temperature of human body .	To measure the temperature of liquids.
Range of scales	35-42C^{0}	0-100 C^{0}
The used liquid	Mercury	Mercury

Constriction	Above the bulb.	No constriction
Structure	1-Transparent thick glass tube. 2- Capillary tube closed from one of its ends. 3-The other end from the capillary tube is connected to a bulb filled with mercury.	

Notes:-

1-Above the mercury bulb, there is a constriction in the capillary tube. G.R

To prevent the mercury from going back to the bulb quickly in order to read the measurement easily.

2-The medical thermometer must be put in ethyl alcohol before using.G.R

To sterilize the medical thermometer.

3-We must shake the medical thermometer well before using. G.R

To force the mercury to return back to the mercury bulb.

4-The thermometer must be kept out the reach of the children. G.R

Because mercury is a toxic material.

5-Mercury is used in making thermometers .G.R

1-Because it is a liquid metal that can be seen easily through the thermometer glass.



2-It is a good conductor of heat.

3-It is a regular expanding material which gives an accurate estimation.

4-It doesn't stick to the wall of the capillary tube

Notes : -

#- The Swedish scientist " Andres Celsius " created the Celsius scale in 1747 .

-Don't seize the thermometer firmly with your teeth in order not to be broken because mercury is toxic .

-The scale in the medical thermometer starts from 35 C^0 to 42 C^0 each degree is divided into 10 parts so , each part equals 1/10 degree .

- The normal temperature of healthy person is 37 C^0 .

- Celsius is measuring unit of temperature.

#- Celsius thermometer scale start from 0 to 100 C^0 degree Celsius .

- Every degree is represented by one part on this scale .

#- The Celsius thermometer can measure the melting point of ice (0^0C) and the boiling point of water (100^0C)

Work sheet

Lesson 2:-Measuring temperature

1-Write the scientific term :-

1-A device used to measure the temperature of the atmosphere . (…………….)

2- A device used to measure the temperature of the human being.(……………….)

3-The liquid used in making thermometers. (……………….)

4-A device used in measuring the temperature of liquids . (…………………)

5- A tool used to measure human body temperature . (…………………..)

6- The liquid that is used in sterilizing the medical thermometer . (………………)

7-The melting point of ice .(…………..)

8- The boiling point of water .(…………………)

9- The part of medical thermometer that prevents mercury from going back to the bulb .(………………..)

10-A liquid metal is regular expanding and doesn't stick to the wall of thermometer . (………………………..)

2-Give reason (write an explanation)

1-Mercury is used in thermometer .

………………………………………………………………………………………………
……………………………………………………………………………………

……………………………………………………………………………………………

2-In the clinical thermometer there is a constriction in the capillary tube .

……………………………………………………………………………………………..

3-We must shake the medical thermometer well before using .

……………………………………………………………………………………………

4-The mercury gives wide range to measure the temperature .

……………………………………………………………………………………..

5-The medical thermometer is damaged when its put in boiling water.

…………………………………………………………………………………………
………………………………………………………………………………………

3-What is meant by:-

1-Heat: - ………………………………………………………………………..

2-Temperature: - ………………………………………………………………….

4-Write one function:-

1-Medical thermometer……………………………………………………..

2- Celsius thermometer……………………………………………………….

3- Constriction…………………………………………………………………

4-Mercury…………………………………………………………………….

Unit 3:-Atmosphere

Lesson 1:- oxygen

Atmosphere

It is a mixture of different gases that surround the earth. **(Attracted by gravity)**

Importance of atmosphere

1- It protects us from ultraviolet rays. (by ozone layer)….G.R

Because ozone layer absorbs ultraviolet radiations.

2- It adjusts the temperature of the earth.

Notes:-

Air pollutants

- It contains smoke and dust (from air pollutants) but they cause the condensation

Of water vapor into rains and snow.

Although smoke and dust are from air pollutants they have an importance.

Because they cause the condensation of water vapor into rains.

The components of atmosphere :-

Nitrogen (78% of the atmosphere) The most abundant gas.

Oxygen (**21%** of the atmosphere) one fifth.(1/5)

Carbon dioxide, water vapour and other gases (1% of the atmosphere).

1-Oxygen

Structure of oxygen:-

It consists of two –atoms molecules so it is symbol as O_2.



oxygen molecule

Source of oxygen :

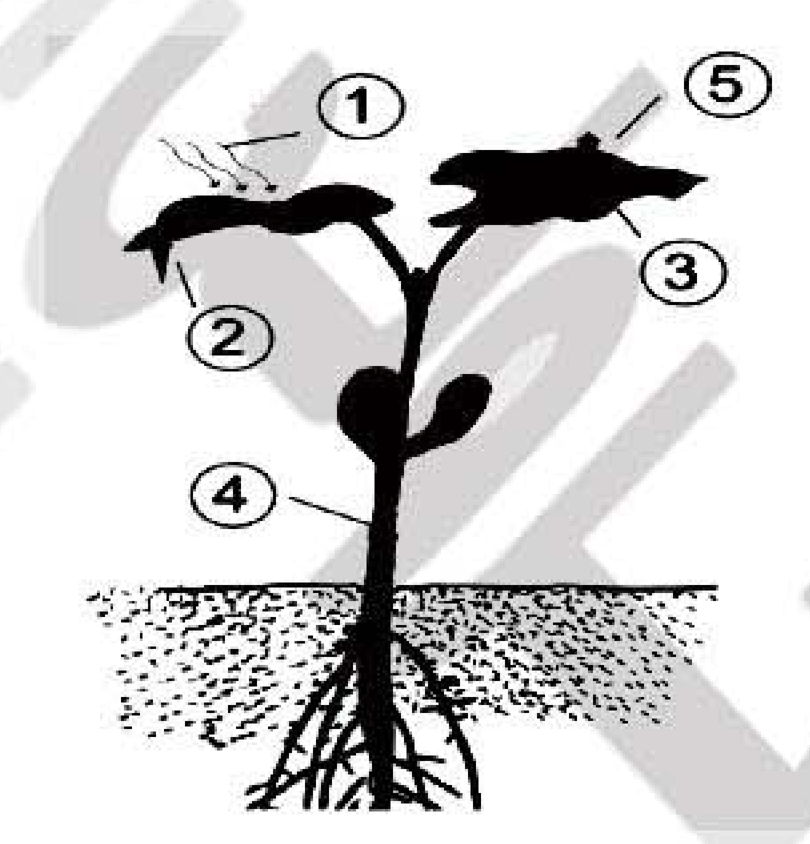
* Green plants are the main source of **oxygen**
* During photosynthesis the plant absorbs

- Water and salts (from soil), CO_2 and sunlight.

and the plant gives oxygen and nutrients (food)

Oxygen exists in a fixed ratio in the atmosphere. G.R

Because oxygen gas is consumed in respiration and combustion process and this compensated by photosynthesis process that takes part in green plants.



Write the chemical equation which represents photosynthesis process.

………

……………………………………………

Activity: - **To prove that the percentage of oxygen in air is 21% (1/ 5)**

Steps:-

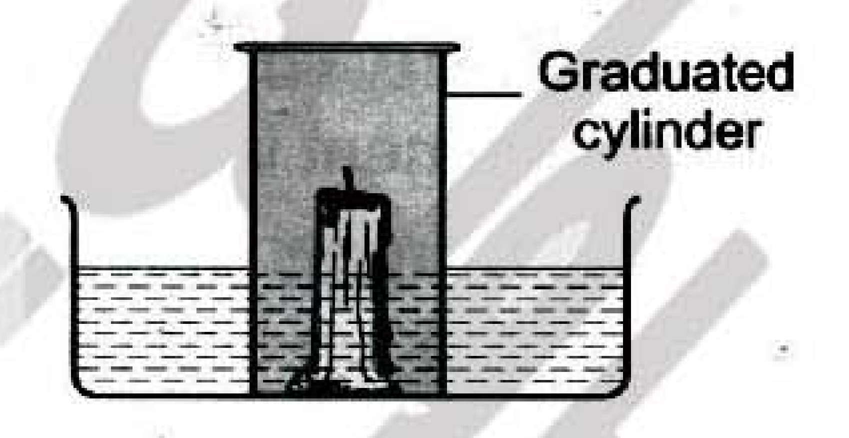
- Fix a lighted candle inside a basin containing colored water
- Cover the candle with a graduated cylinder.

Observation :-

The candle put out and the water rises to one fifth of the cylinder.

Conclusion:-

The oxygen consumed in the burning of the candle (1/5 of air) and water replaces the consumed oxygen .



Preparation of oxygen in laboratory

Steps:-

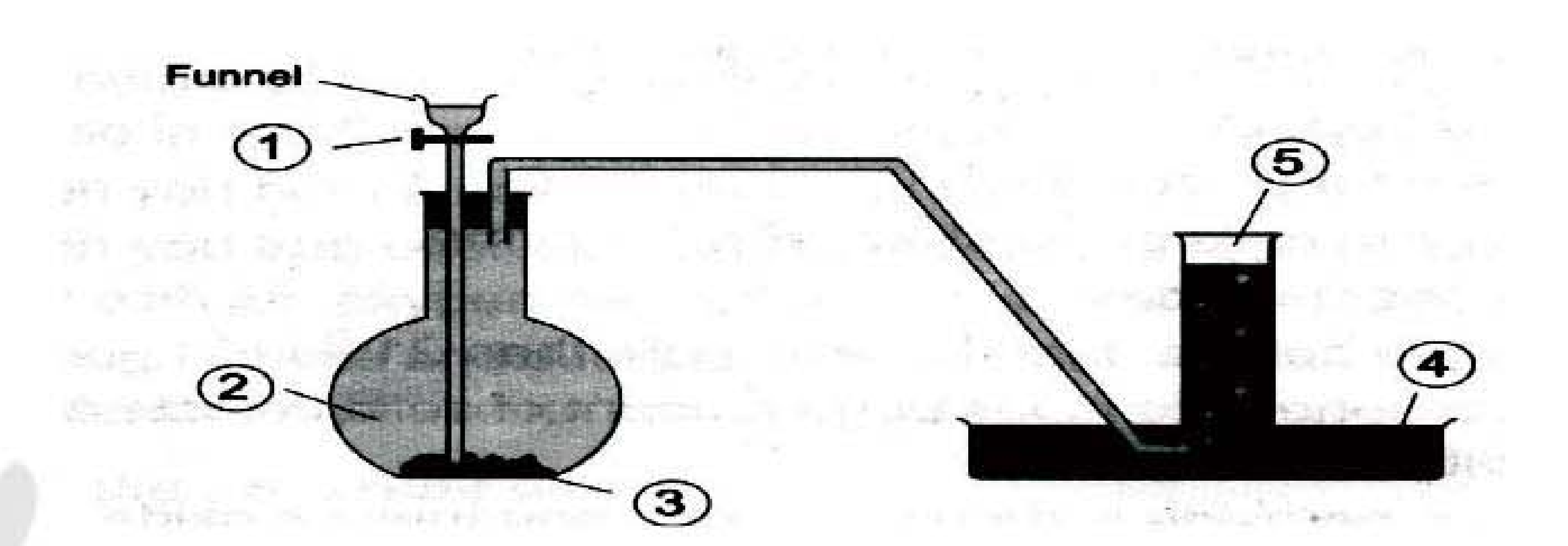
open the tap to allow the hydrogen peroxide to go down to the manganese dioxide.

Observation:

oxygen gas is obtained at the top of the cylinder.

Conclusion:

Hydrogen peroxide decomposed into water and oxygen in the presence of Manganese dioxide (acts as a catalyst).



<u>Catalyst: -</u> is a chemical substance that remains without a change in its quantity and properties during the chemical reaction.

<u>Give reasons :-</u>

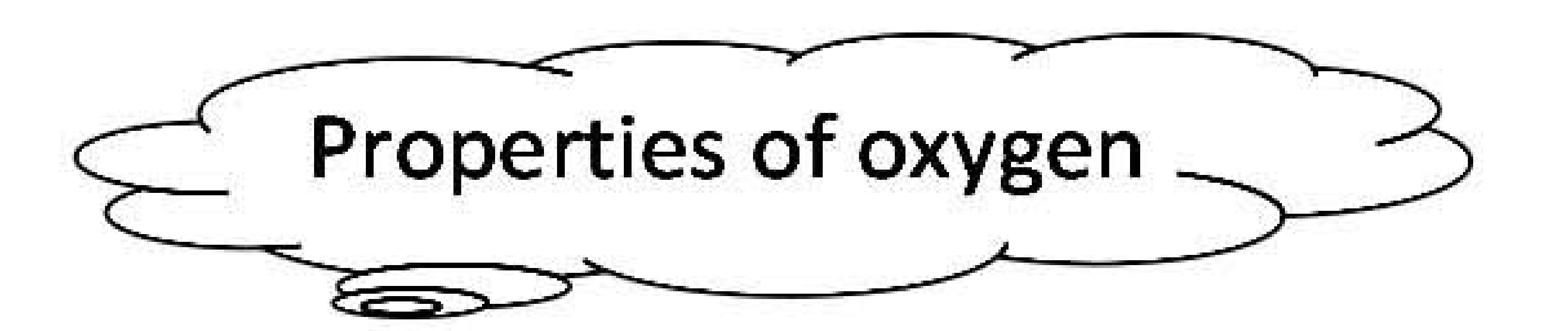
* Manganese dioxide act as a catalyst.

Because its quantity and properties don't change during the reaction.

* Oxygen is collected by downward displacement of water.

Because oxygen is scarcely soluble in water.

<u>Downward displacement of water: -</u> it occurs when oxygen gas replaces the water in the cylinder and it is collected at the top of the cylinder.



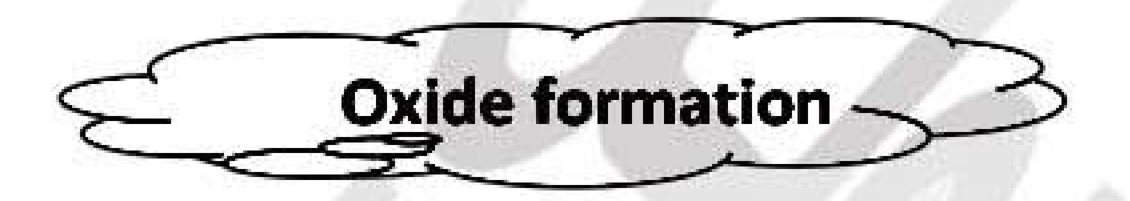
1-It has **no color or smells** (colorless, tasteless and odorless).

2-It **scarcely** (rarely) dissolves in water.

3-It has **a neutral** effect on (red and blue) litmus papers.

4-Oxygen **doesn't burn**, but helps in burning.

5-Oxygen is **heavier** than air as it replaces the air upward.



The ability of oxygen combines with elements to form element oxide.

Element + oxygen → element oxide

Iron + oxygen → Iron oxide

Oxygen combines with elements in two ways

***1-Oxidation**:-*

It a slow combination between oxygen and element in the presence of moisture

(water)

Ex: iron rusting.

***Note*:**

When you wet some nails with water and leave them in air for several days they

lose metallic luster (rusting of the nails)

Problems of iron rusting:

Iron rusting causes damage and erosion of ironware such as bridges pillars.

-**Iron ware must be painted from time to another. G.R**

To protect them from rusting.

Burning (Rapid combustion):

It is a rapid combination (union) between oxygen and element and produce heat and light.

Ex:- burning of a piece of cleansing wire.

Note:-

The mass of the element increases when it combines with oxygen rusting.

(i.e. The mass of iron oxide is more the mass of iron)

The mass of cleansing wire increases when you burn it G.R

Due to the combination with oxygen during burning.

Importance of oxygen

1- **Oxygen is important for human and all living organisms. G.R**
   Because it is important for respiration processes inside living cells to produce energy.

2-Respiration of patients, divers and during climbing mountains by oxygen cylinders.

It is used during climbing mountains .G.R

Because oxygen becomes lighter when we rise up.

3- Oxygen is used in food burning.

4- Oxygen enters in the formation of water (water consists of oxygen and hydrogen).

5- Oxygen enters in the formation of ozone layer (O_3) that protect us from U.V

6- Cutting and welding metals by using oxygen cylinders. G.R

Because oxygen combines with acetylene gas to produce oxy-acetylene which is used for cutting and welding metals because its temperature is 3500 °C.

7-Oxygen gases compressed in iron cylinders and have many usages.G.R

Because it is used in:-

1-Mechanical ventilation for patients who suffer from breathing difficulties.

2- During surgeries.
3- During diving and climbing mountains.

Do you know …..?

Oxygen was discovered in china then it was re-discovered by **Joseph Priestley.**

Antoine Lavoisier gave it the name oxygen



Unit three

Lesson 3 : oxygen

1-Write the scientific term :-

1- A slow combination of oxygen with an element in the presence of moisture. (……………………..)

2- Catalyst used in preparation of oxygen gas. (…………………..)

3- The gas represents one fifth of the volume of atmosphere. (……………)

4- It is a rapid union between oxygen and element that produces heat and light (……………………..)

5-A flame used in cutting and welding metals. (…………….)

6-A layer that protects the earth from harmful radiation that comes from sun.(………………..)

7- A gas forms 78 % of the air volume. (………………)

8- A gas form 21 % of the air volume. (………………)

9-A substance that remains without any change in its quantity and properties during the chemical reaction.(………………)

2-**Complete the following :-**

1-……………. and …………. are from the uses of oxygen gas .

2- Oxygen gas has ……………. effect on red and blue litmus paper .

3-The oxygen gas is produced plentifully from …………….. during ……………….

4- Oxygen is …………….. than air, so it can replace air .



3-Give one reason :-

1- The percentage of oxygen remains constant in the atmosphere.

…………………………………………………………………….

2-When you burn a ball of cleansing wire strongly, its mass increases.

…………………………………………………………………….

3- Ozone layer is very important for us .

…………………………………………………………………….

4-Oxygen cylinders are used during climbing mountain.

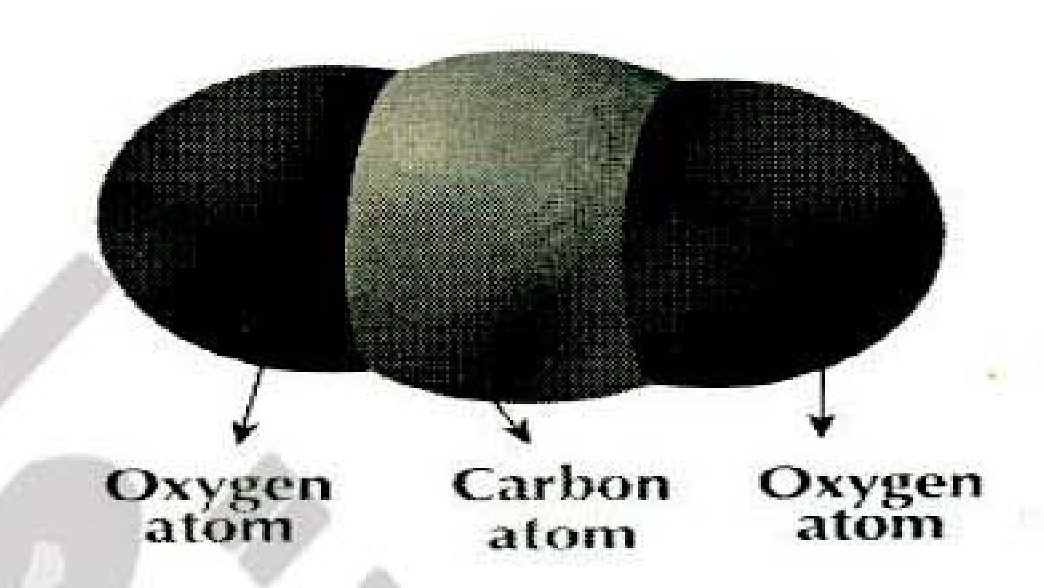
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Lesson2:-Carbon dioxide

Structure of carbon dioxide

It consists of one carbon atom and two oxygen atoms .

Its symbol is CO_2



* It forms 0.03% of the air volume .

Give reasons :

The symbol of carbon dioxide is CO_2

Because it consists of one carbon atom and two oxygen atoms .

****

Carbon dioxide resources :

* Carbon dioxide is produced due to the **combustion** (burning) of organic materials (as wood , coal , oil , gasoline and tobacco)

* Carbon dioxide is produce due to the **respiration** of living organisms.

Importance of carbon dioxide :

1-It is used by the plant to make **photosynthesis process.**

2-It is used for extinguishing **(put out**) fires because it does not burn and does not help in burning .

3-It is used to make **soft drinks.**

4-It is used to make bread porous and tasty (when yeast is added to bread it gives CO_2 which expand by heating and make the bread porous and tasty) **(Fermentation process).**

5-**Refrigeration** on converting it into a liquid by pressure and cooling then pressure is decreased to form dry ice used for refrigeration .

Harms of increasing the ratio of carbon dioxide are :

* Suffocation of living organisms (hard breathing)

* Global warming (increases the temperature of the earth's climate)



Reasons for increasing the ratio of carbon dioxide are :

* The massive burning of fuel (in factories and transportation engines)

* The removal of forests .

Preparation of carbon dioxide :

It is prepared by adding dilute hydrochloric acid to calcium carbonate.

Carbon dioxide is collected by upward displacement of air.

because it is heavier than air

Carbon dioxide can not be collected by displacing water .

Because it dissolves in water .

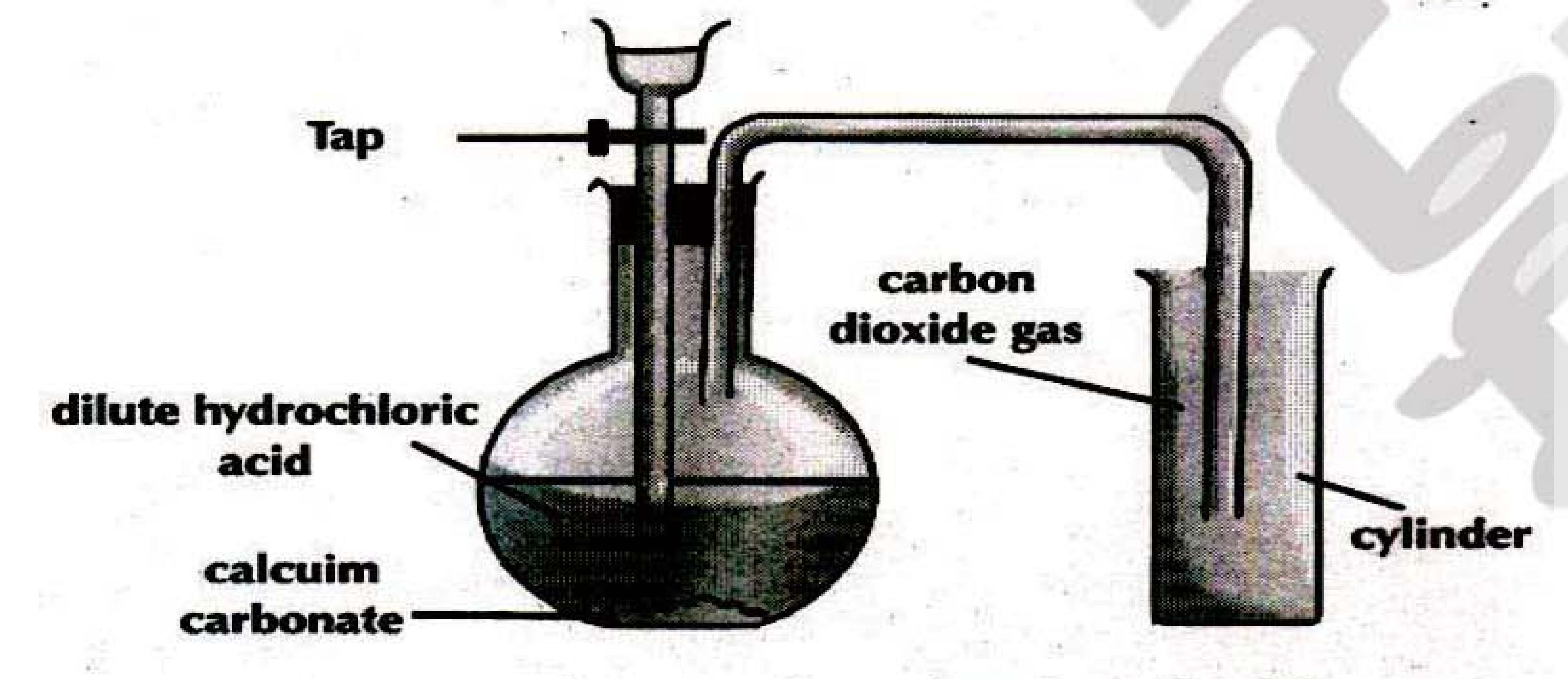


Fig (3–20) *Preparation of Carbon dioxide*

Give reasons :

Carbon dioxide is collected by upward displacement of air.

Because it is heavier than air.

Carbon dioxide can not be collected by displacing water.

Because it is dissolve in water.

****

Properties of carbon dioxide :

1-It is colorless and odorless.

2-It is heavier than the air so it is collected by displacing the air upward .

3-It easily dissolves in water so it is not collected by displacing water as in preparation of oxygen .

4-It does not burn and does not help in burning so it is used for extinguishing fires.

5-The magnesium ribbon keeps burning and turns into a magnesium oxide (white color) and carbon (coal) deposits on the wall of the cylinder .

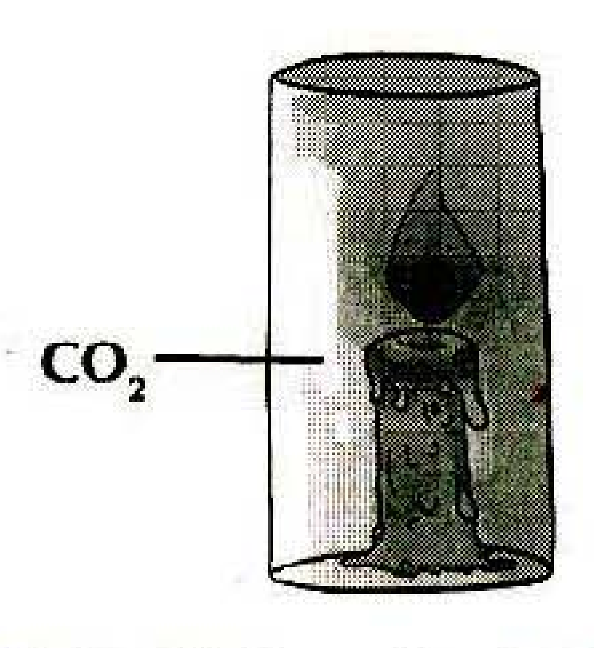


Fig (3-21) the candle extinguishes in CO_2.

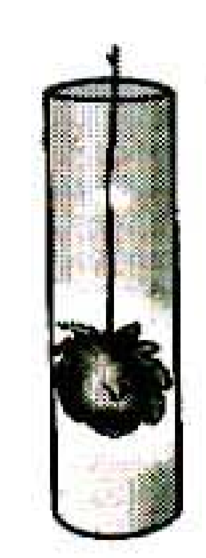


Fig (3-22) *The magnesium ribbon keeps burning in carbon dioxide.*



Fig (3-23) *Carbon dioxide used in extinguishing fires*

Give reasons :

Carbon dioxide is used to put off the fires .

Because it does not burn and does not help in burning .





Unit three

Lesson 2 :-Carbon dioxide

1-Write the scientific term:-

1-A chemical substance formed when carbon dioxide gas passes through limewater.(……………………)

2- A gas used during photosynthesis process in green plants . (……………….)

3- A gas used to put off (extinguishing fires) . (…………………..)

4- The method used to collect carbon dioxide gas during its preparation.

(…………………………)

5- A chemical substance that is used to detect the presence of carbon dioxide gas.

(……………………….)

6 - It is added to dough to produce carbon dioxide gas during fermentation process.

(……………………….)

7 – The process that carbon dioxide evolves when added yeast to dough and makes the bread tasty . (........................)

8 – The gas that heavier than air and easily soluble in water . (..................)

9 – A Chemical substance added to calcium carbonate during the preparation of carbon dioxide gas . (....................)

10 – The material that is used in making cigarettes . (.................)

2- Complete the following :-

1- Exhaled air contains a large amount of .... gas that caused the turbidity of ....

2 –carbon dioxide molecule consists of one .... atom and two .... atoms and its symbol is ....

3- By adding dilute hydrochloric acid to calcium carbonate, ... gas evolves.

4- Carbon dioxide is collected by displacing the .... upward .

5 – Carbon dioxide gas exists in the atmosphere with a ratio .... %

Lesson 3

Nitrogen

Nitrogen

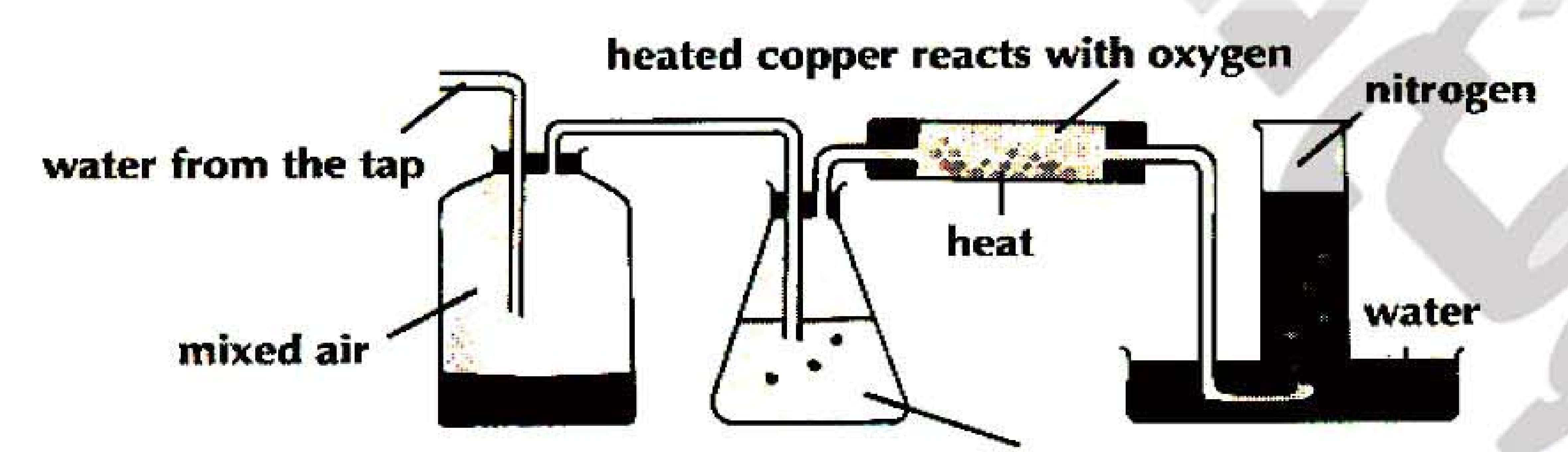
* The molecule of the nitrogen consists of two nitrogen atoms so its symbol is N_2

* Nitrogen is called azote (lifeless) because it doesn't help in burning and respiration .

* Nitrogen forms 78% of the Earth's atmosphere .

* Rutherford was the scientist who discovered the nitrogen .

Preparation of nitrogen in the laboratory :



Steps :

* Make an apparatus as in the figure .

* Open the water tap to push the air in the first flask to pass through the solution of

sodium or potassium hydroxide to absorb carbon dioxide

* Let the air pass over the hot copper to combine with oxygen .

Observation :

Nitrogen is collected by the downward displacement of water .

Conclusion :

Nitrogen can collect by downward displacement of water because it is scarcely

soluble in water .

What is the role of these materials in preparation of nitrogen ?

1. **Sodium or potassium hydroxide .** (It absorbs carbon dioxide from air)

2. **Hot copper** (It absorbs oxygen from air .)



Give reasons :

1. Nitrogen can collect by the downward displacement of water .

Because it is scarcely (little) soluble in water .

2. The main source of nitrogen is the air .

because air is rich in nitrogen (78%)

Properties of nitrogen :

* It is colorless , tasteless and odorless .
* It is scarcely dissolves in water .
* It doesn't help in burning .
* It doesn't combine with most of elements (inactive)
* Nitrogen can be condensed to a liquefied state .
* It gas combines with lighted magnesium ribbon forming a white substance that reacts with reacts with water forming ammonia gas which has pungent smell .

===

Importance of nitrogen :

* Nitrogen is the main component of all **proteins.**

(So nitrogen form protein which is necessary for building up all living tissues)

* Legumes such as clover, peas and soybeans can form protein from atmospheric

Nitrogen by the help of some type of bacteria that live in their roots.



* Nitrogen used to produce ammonia and ammonium nitrate which are used as **fertilizers** .

* Nitrogen is used to **fill some types of lamps** .

* Nitrogen is used as **inactive material** in the tanks of explosive liquids and flammable materials as petroleum.

* Nitrogen can be changed into liquid nitrogen to be used in :

- treatment of skin tumors .
- rapid cooling of food (**food preservation**)and medicine because liquid nitrogen has very low temperature)

(ex : a banana freezes quickly when it put in liquid nitrogen

* Nitrogen is recently used in filling **car tires** because its volume is relatively constant by changing the temperature .

* Nitrogen is used in the formation of **gunpowder**, **stainless steel** and **electronic** devices .

Notes :

* Nitrogen oxides are formed by the combination between nitrogen and oxygen during lightening and nitrogen oxides reach soil with rain water.

* To form ammonia nitrogen combines with lighted magnesium ribbon to form white substance and by adding little water to the white substance it gives ammonia with pungent smell and alkaline effect on litmus paper (change the red litmus paper into red)

==

Give reasons :

1-Liquid nitrogen is used for cooling food and medicine .

Because it has very low temperature .

2-Nitrogen is very important for all living organisms .

Because it is used to make protein which forms body tissues .

3-Nitrogen is used in the tanks of explosive liquids .

Because it is inactive (doesn't help in burning)

==

Explain how can you get :

Ammonia from nitrogen .

……………………………………………………………………………………………………

……………………………………………………………………………………………………

work sheet

Unit three

Lesson 3: Nitrogen

1-write the scientific term :-

1- A gas that has an alkaline effect on litmus paper. (   )

2- It is used for treatment of skin tumors and for cooling food products.

(   )

3- A gas used in the manufacture of ammonia. (   )

4- Chemical substance that absorbs carbon dioxide gas from the air. (   )

5- It contributes in composing gunpowder, ammonium nitrates and fertilizer.

(   )

6- A gas used in filling tires of cars and planes. (   )

7- The most abundant gas in the atmospheric air. (   )

8- It forms about 78% of the volume of the atmosphere. (   )

9- The main source of Nitrogen gas. ( )

10 –A gas that composes the protein substance that builds up our bodies.

( )

11 –It is used to absorb oxygen gas from air during preparation of nitrogen in laboratory . ( )

12- A gas used to store petroleum , flammable materials and liquefied explosive materials. ( )

13- It is used in making stainless steel , electronic devices and gunpowder .

( )

14- A gas used in small amounts to fill some types of lamps. ( )

15- Chemical substances included in the composition of soil fertilizers. ( )

16- A gas is called azote which means lifeless gas . ( )

2-Give reason for :

1- Nitrogen is recently used in filling car tires and airplanes tires .

……………………………………………………………………….

2- Liquefied nitrogen is used for cooling food products and medicines.

……………………………………………………………………….



3- The main source of nitrogen preparation is the air .

…………………………………………………………………….

4- During preparation of nitrogen, air is passed over sodium or potassium hydroxide.

………………………………………………………………….

3-What happens when :-

1- The percentage of nitrogen gas decreases in nature .

…………………………………………………………….

2- Atmospheric air is passed over hot copper.

…………………………………………………………….

3- Atmospheric air is passed over sodium or potassium hydroxide.

……………………………………………………………..

4- Oxygen reacts with nitrogen during lightning .

…………………………………………………………….

5- Getting rid of soil bacteria.

…………………………………………………………….

Unit 4

Lesson1:-Human nervous system

Nervous system:-

- It is the communication and controlling system.

The nervous system consists of:-

a. Brain b. Spinal cord c. Nerves

The structure of the nervous system

Neuron: - It is the structural and function unit of nervous system .

Consists of: - 1-Cell body

2 - Axon

The main function of nervous system :-

1) It receives information from your environment and from your body. Then it interprets this information and makes the body respond to it.

2) It helps you to know if things are hot, cold, sweet, rough, bitter, or smooth

3) It adjusts your movement.

4) It protects you from harm

5) It makes you feel pain.

6) It makes you solve problems and learn music.

7) It adjusts the responses and emotions as :-

(Makes you happy – sad – angry or calm)

8) It oversees and regulates the multiple functions performed by the human body such as moving , feeding , digestion , breathing , thinking and others .

Note:-

The adult human, brain weight about 1.5 kg



- **The structure of the nervous system:-**

* **Central** nervous system (brain and spinal cord)

* **Peripheral** nervous system (12 **cranial** nerves and **31 spinal nerves**)

Compare between central and peripheral nervous system:-

Central nervous system	Peripheral nervous system
1-Brain 2- Spinal cord	1- Cranial nerves. 2- Spinal nerves.

***Neuron (nerve cell)*:-**

It is the building and function unit of the nervous system.

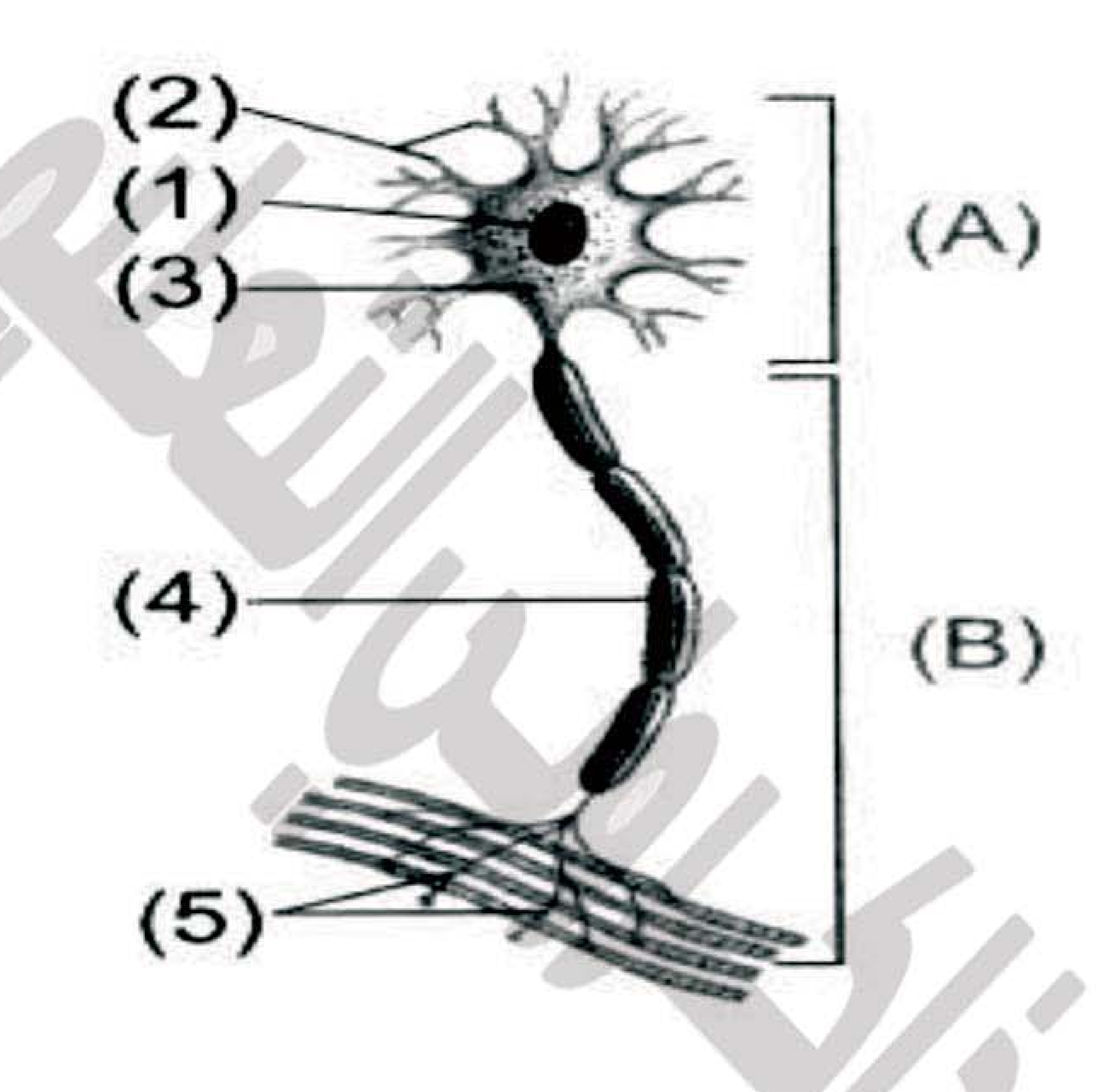
It consists of two parts:-

a. The cell body **b. The axon**

a. The cell body:-

It contains a nucleus, cytoplasm and plasma membrane.

There are branches extending from the cell body called **dendrites.**



Function of dendrites:-

They connected to the neighboring neurons to form synapse **(synaptic area).**

b. **The axon**:-

It is a cylindrical axis covered by fatty layer called **myelin sheath.**

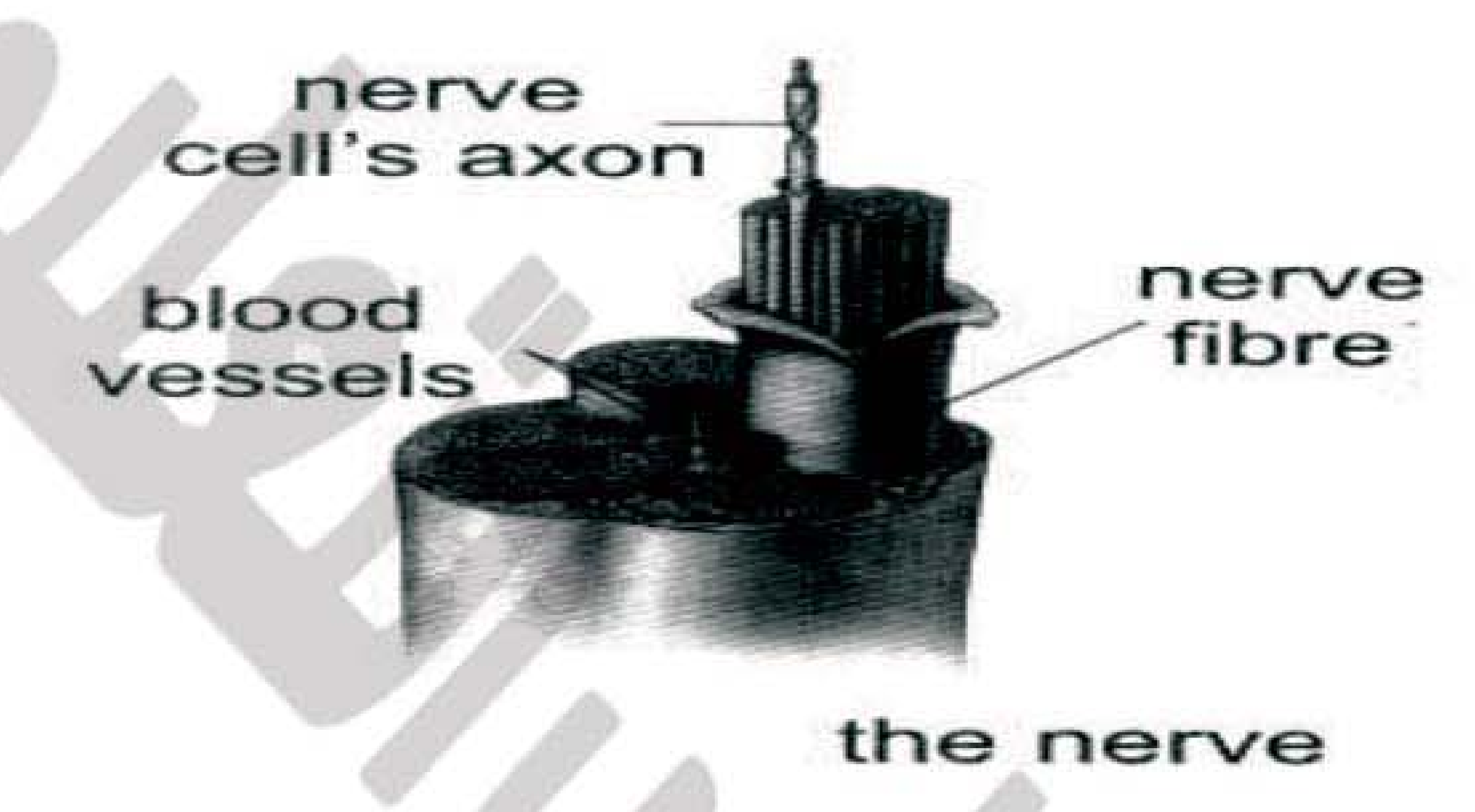
The axon ends with axon terminals **(nerve ending).**

Function of axon terminals:-

They connected to the muscles to form synapse

With other neurons.

Nerve axons —form→ nerve fiber —form→ nerve.



First: ***The central nervous system:-***

It consists of the brain and the spinal cord

Brain: - it is a nerve block containing millions of nerve cells and it is the main control center in your body.

Location of the brain: - the brain in a bony box called skull .....G.R

To protect the brain.

Structure of the brain: -

It consists of three parts which are:-

1-Cerebrum (two cerebral hemispheres)

2-Cerebellum

3-Medulla oblongata

Function of the brain: - it directs and coordinates all the processes ,ideas, behaviors and emotions.

The brain is the main control center in the human body G.R

Because it directs and coordinates all the processes, ideas, behaviors and emotions.

Longitudinal section of the brain

b. **The outer part of the brain: -** is a grey matter.

c. **The inner part of the brain: -** is a white matter.

Note:- The structure of the sheep s brain is similar to the structure of the human's Brains.



1-It is the largest part of the brain.

2- It is divided into two halves (right and left) which are called **two cerebral hemispheres.**

3- The **outer surface** of it is called grey **matter or cerebral cortex.**

4- The inner surface called the **white matter**.

5- The two hemispheres have many **folds and convolutions.**

Importance of cerebrum (the two cerebral hemispheres)

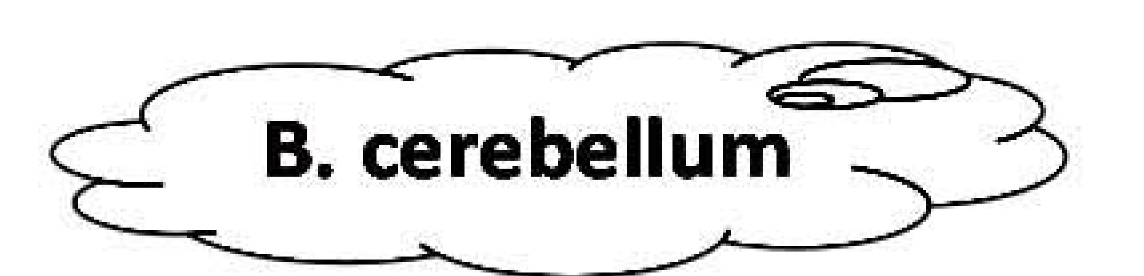
1-They control the voluntary movements as running.

The cerebrum helps you in winning races. G.R……

2-They contain the centers of thinking and memory

3-They receive the nerve impulses from sense organs (eye, nose and……..) and send suitable responses to these impulses.





It lies at the back area of the brain below the two cerebral hemispheres.

Function of cerebellum:-

Keeps the balance of the body during the movement.

c. The medulla oblongata

c. The medulla oblongata:-

1- It lies in front of the cerebellum.

2- It connects the brain to the spinal cord.

Function of medulla oblongata:-

It is responsible for the involuntary processes as:-

1-heart beats.

2-Movement of the digestive system and respiratory systems.

The damage of medulla oblongata leads to death. G.R

Because it controls the involuntary processes as heart beats and respiration .





b. The spinal cord:-

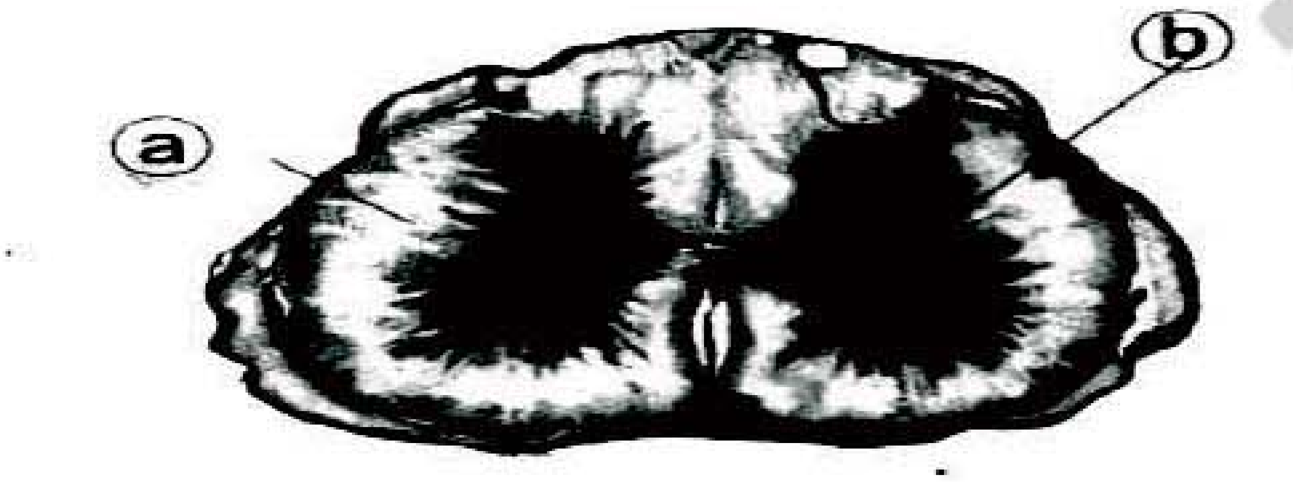
It is a cylindrical cord from which the spinal nerves extend.

Location of the spinal cord:- it is extending in a channel with a series of vertebra in the backbone (Vertebral column) for protection.

Structure of the spinal cord:-

1 - External **white matter.**

2- Internal **gray matter** has the shape of **letter H**



Functions of the spinal cord:-

1-It carries the nerve impulses from the body organs to the brain and vice versa.

2- It responsible for the reflex action.

==

Second: the peripheral nervous system

It is the nerves which emerge from the central nervous system.

(**Brain and spinal cord)**

It consists of:-

1-cranial nerves (12 pairs emerges from the brain)

2-Spinal nerves (31 pairs emerges from the spinal cords)

Function of the peripheral nervous system

It carries **(delivers**) nerve messages from the organs to the central nervous System and the suitable responses to the body organs.



It is involuntary response that the body makes by nervous system when it is subjected to an external stimulus such as (Light, heat,……….and)

Examples of reflex action :-

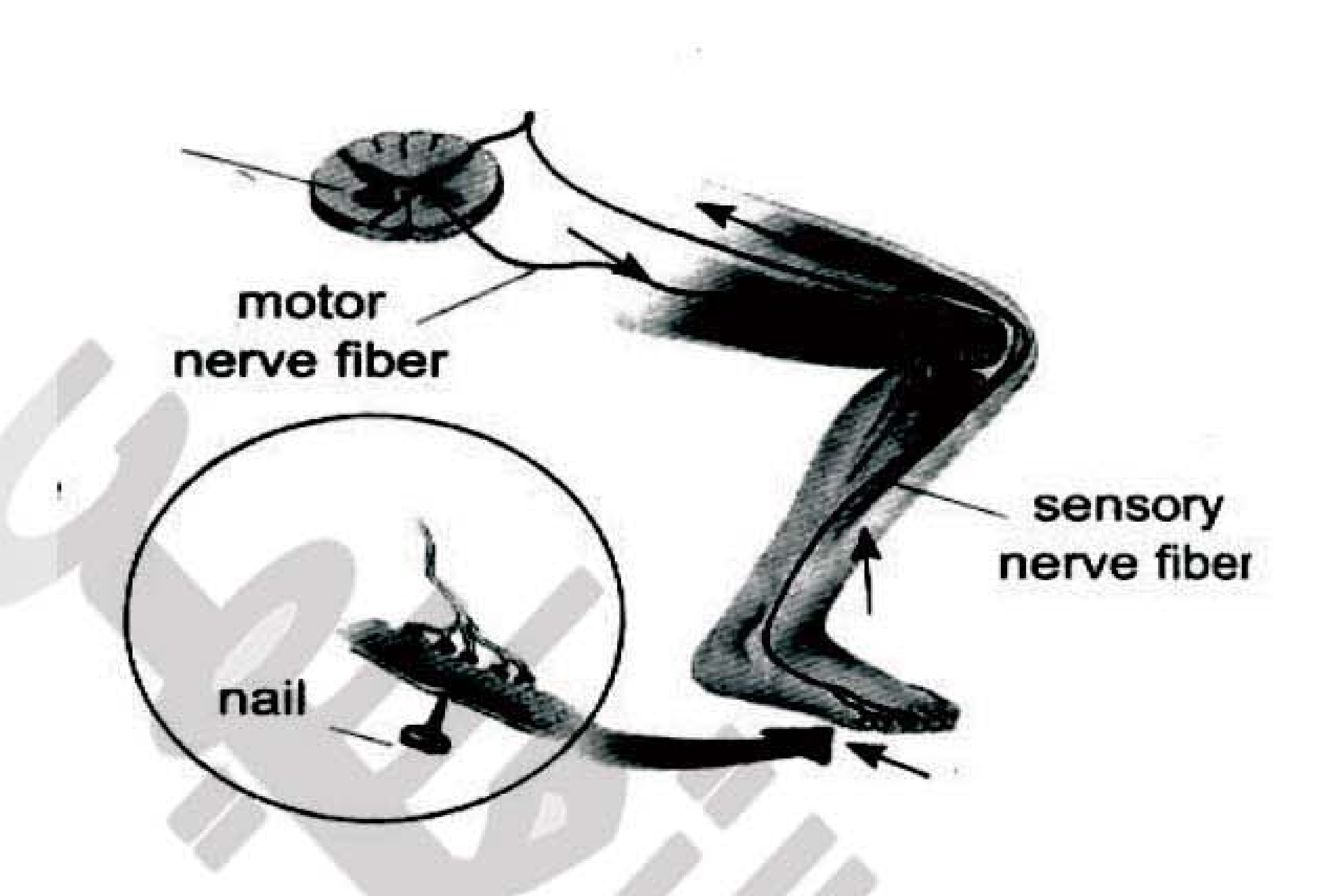
* Remove your hand quickly when you touch a plant with sharp thorns.
* Remove your hand quickly when you touch a hot surface.
* Blinking when something gets close to the eye.
* Sweating in hot days.
* Secreting saliva on smelling food.
* Trying balance during sliding down.
* Running quickly on seeing fast car coming towards you.
* Constriction of eye pupil on intense light.
* Widening of eye pupil on dim light.

Stages of the reflex action

1-The thorns affect the nerve ending (axon terminals) in the fingers producing nerve impulses (message**).**

2-The nerve impulses move to **the spinal cord** (through sensory nerve).





3- **The spinal cord** sends nerve impulses to the muscles of the arm to move away

From the thorns. (Through **motor nerve**)

How to keep (maintain) the nervous system healthy ?

1-Avoid drinking of much tea, coffee (stimulating substances) .G.R

Because a . This affects the sleeping periods.

b. Affects the heart beats.

c. Leads to nervous tensions

2- Avoid using the tranquilizers.

3-Avoid sitting in front of computer and television for long periods. G.R

To avoid exhausting of sense organs.

4- Avoid staying in noisy places and smoke. G.R

Because that affects the nervous system.

5- Give the body enough time for rest and sleeping .





Unit 4

Lesson 1: Human nervous system

1-Give reason for :

1- Damage of the medulla oblongata causes death .

………………………………………………………………………………

2- The brain is located inside skull .

………………………………………………………………………………

3- The spinal cord is surrounded by the vertebrae of the backbone .

………………………………………………………………………………

4- You must reduce the intake of the stimulating substance such as tea and coffee.

………………………………………………………………………………

5- Withdrawal of the hand quickly when it suddenly touches a hot surface .

………………………………………………………………………………

6- Muscles play an important role in human movement .

………………………………………………………………………………

2-Mention the function for each the following : -

1)Medulla oblongata : ……………………………………

2)Cerebellum : ……………………………………………

3) Cerebrum : ……………………………………………

4) The skull: ……………………………………………

5) Spinal cord: …………………………………………

3-Mention the location :

1) Medulla oblongata

…………………………………………………………

2) Cerebellum

…………………………………………………………

3) Cerebrum

…………………………………………………………



Lesson2

The locomotory system

Locomotory system:- the system that is responsible for applying the movement

The structure of the locomotory system :-

a. The skeletal system. b.The muscular system .

A-The skeletal system

It consists of :-

1. **Axial skeleton** .
   a-skull b. backbone c. rib cage
2. **Appendicular skeleton**.
   a. upper limbs b. lower limbs

B-The muscular system :-

It is the system that moves our body (**engine of the body)**

The role of the muscles in performing movement:-

1-The muscular system is the engine that move sour body.

2-Muscles generate the mechanical energy and movement to the body.

3-**Muscles can generate movement to the body…G.R**

Due to the ability of the muscular cells to contract and relax.



They are long strips that fix the muscles to the bones.

Types of muscles

Voluntary muscles	Involuntary muscles
1-They are muscles that can move willingly . 2-You can control its movement.	1-They are muscles that can automatically . 2-You can't control or even aware of their movements.
Examples:- The limb muscles, trunk muscles, face muscles and abdominal wall muscles.	Examples:-The gastrointestinal tract, the blood vessels and bladder muscles.

What happens when ………?

1. The front muscle contracts and the back muscle relaxes .

   The arm moves up.

2. The back muscle contracts and the front muscle relaxes .

   The arm moves down .

How can we keep the locomotory system healthy ?

* Eating food rich in calcium , phosphorous and vitamin D .

To prevent bone diseases such as steomalacia and rickets.

* Don't carry heavy things .

* Don't jump from high places.

* Sitting correctly during studying and reading .

* Do exercises

* Expose the body to sunlight to provide the body with vitamin D .

* Vaccination children against children polio .



Unit 4

Lesson 1: Human nervous system

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……………………………………………………………………………

6- Muscles play an important role in human movement.

……………………………………………………………………………

2-Mention the function for each the following : -

1) Medulla oblongata: ………………………………….

2) Cerebellum: ………………………………………….

3) Cerebrum: ....

4) The skull: ....

5) Spinal cord: ....

3-Mention the location:

1) Medulla oblongata

....

2) Cerebellum

....

3) Cerebrum

....



Skeletal system

1-Axial skeleton

Movement :- It is the ability of organisms to change its position from a place to another.

The locomotory system : - It is the system that is responsible for the body movement .

The skull	The backbone (Axis of the skeleton)	The ribcage
Structure:- it is a **bony box** that contains cavities for eye , ears and nose .	1-It consists of 33 vertebrae 2- **There are cartilages between vertebrae…G.R** **to** prevent the friction between them during motion.	it consists of **12 pairs** of ribs (the first **10 pairs** are connected to the **breast bone** (**sternum**) interiorly
Function : - it protects **the brain** .	1-Protects **the spinal cord.** 2-Allows the body to move (bend) in all directions.	1-It protects the lungs and heart 2-Helps in **respiration** (Inhalation and exhalation processes.)

Skeletal system 2-Appendicular skeleton

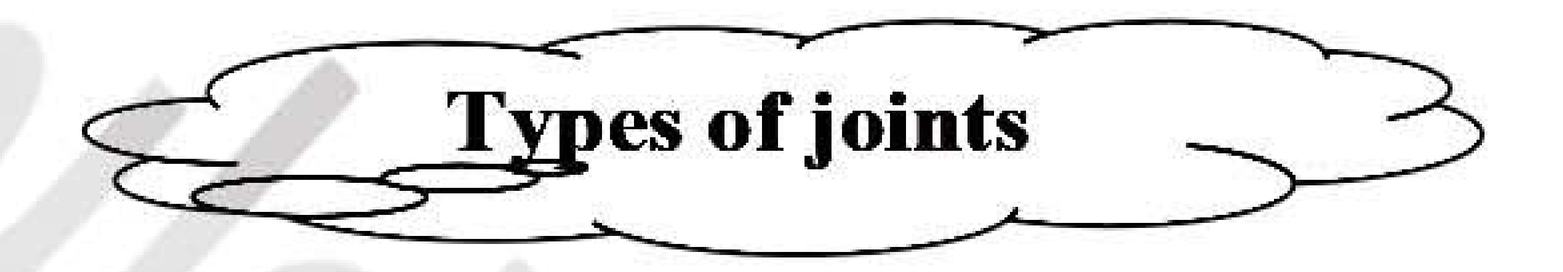
Bones of the upper limbs	Bones of the lower limbs
Structure: - Humerus bone , fore arm bone and hand bones. it is connected to the axial skeleton through the **shoulder bones**.	**Structure :-**femur bone , shaft bone and foot bones it is connected to the axial skeleton through **pelvic bones** .
Function:- help us for eating , drinking and writing.	**Function:-**it helps us for walking, carrying the rest of the body and running.

Joints and their significance to movement



It is the location at which bones meet each other.

Function of the joints:- allows the movement between bones.



There are three of types joints are :-.

Immovable joints	Slightly movable joints	Freely movable joints
They do not allow any movement .	They allow movement in one direction only.	They allow movement in all direction.
Example : -Skull	Example :- knee and elbow	Example : - shoulder, wrist ,thigh (hip)



Unit 4

Lesson 2 Human locomatary system

1-Mention the function :

1) Joints : - ……………………………………………………………….

2) Ribcage : - ……………………………………………………………..

3) Backbones : - …………………………………………………………….

3) Upper limbs : - …………………………………………………………..

4) Lower limbs : - ………………………………………………………….

5) Nervous system: -…………………………………………………….

6) Dendrites and axon terminals : - …………………………………………..

7) Brain : - ……………………………………………………………………

8) Tendons : - ……………………………………………………………………

9) The muscular system : - ………………………………………………………

10) Cartilage between the vertebrae : - ………………………………………….

2-**What's meant by**:-

Joints ………………………………………………………………………………..

3-Mention four ways of maintaining the locomotory system Healthy .

……………………………………………………………

……………………………………………………………

……………………………………………………………

…………………………………………………………….

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…………………………………………………………….

4-**Mention four way of maintaining the nervous system healthy.**

………………………………………………………………

………………………………………………………………

………………………………………………………………

………………………………………………………………

5- Give reason for : -

1) The infection of medulla oblongata .

…………………………………………………………………………………….

2)Jumping from high places or making violent movements .

…………………………………………………………………………………….

